

CLAIMS

What is claimed is:

1. An apparatus for sensing a characteristic of a droplet, the apparatus comprising:

5 a first plate and a second plate forming a capacitor, the first plate and the second plate being disposed to allow a droplet to pass between them; and
an amplifier coupled to the first plate, the amplifier configured to generate an output signal indicative of a characteristic of the droplet.

10 2. The apparatus of claim 1 further comprising:

a bias voltage coupled to the second plate; and

wherein the amplifier includes a charge sensitive amplifier.

3. The apparatus of claim 2 further comprising an input transistor coupled between the amplifier and the first plate.

4. The apparatus of claim 1 wherein the characteristic includes drop mass.

15 5. The apparatus of claim 1 wherein the characteristic includes drop velocity.

6. The apparatus of claim 1 wherein the droplet is from an ink-jet print head configured to deposit material on a wafer.

7. The apparatus of claim 1 wherein the output signal is employed to calibrate a nozzle that dispensed the droplet.

20 8. The apparatus of claim 1 wherein the apparatus is included in an integrated circuit manufacturing equipment.

9. The apparatus of claim 1 wherein the output signal is provided to a signal processing device.

10. The apparatus of claim 9 wherein the signal processing device includes a computer.

5 11. The apparatus of claim 1 wherein the apparatus is part of a sensor module located near a wafer processing chamber to allow calibration of a print head that dispensed the droplet.

12. The apparatus of claim 11 wherein the print head includes a plurality of nozzles.

10 13. An apparatus comprising:
means for dispensing a droplet;
means for detecting the droplet; and
means for generating a signal indicative of a characteristic of the droplet.

14. The apparatus of claim 13 wherein the characteristic includes drop mass.

15 15. The apparatus of claim 13 wherein the characteristic includes drop velocity.

16. A method of sensing a droplet characteristic, the method comprising:

dispensing a droplet;

detecting the presence of the droplet between two parallel plates that form

20 a capacitor; and

generating an output signal indicative of a characteristic of the droplet.

17. The method of claim 16 wherein the method is performed for an integrated circuit manufacturing equipment.

18. The method of claim 16 further comprising:
processing the output signal to sense drop mass.

5 19. The method of claim 16 further comprising:
processing the output signal to sense drop velocity.

20. The method of claim 16 further comprising:
calibrating a nozzle based on the output signal.

10 21. An apparatus for tuning a mechanism for dispensing materials:
a sensor configured to detect a passing material;
an amplifier coupled to the sensor, the amplifier configured to generate an
output signal indicative of a characteristic of the material; and
a control system configured to generate a tuning signal based on the
output signal, the tuning signal being provided to a mechanism that dispensed
15 the material.

22. The apparatus of claim 21 wherein the output signal is indicative of a
mass of the material.

23. The apparatus of claim 21 wherein the output signal is indicative of a drop
velocity of the material.

20 24. An apparatus for sensing a characteristic of a material, the apparatus
comprising:

a capacitive sensor configured to sense a passing material; and

an amplifier coupled to the capacitive sensor, the amplifier configured to generate an output signal indicative of a characteristic of the material.

25. The apparatus of claim 24 wherein the characteristic includes drop mass.

5 26. The apparatus of claim 24 wherein the characteristic includes drop velocity.